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Fig. 22. Land used in plow culture, in the broad valley bottom of the municipio.

the rocky wooded area of the volcanic *texcal;*[2] in plow culture the land is less sloping, less rocky, relatively treeless, and includes the broad valley bottom in the southern part of the municipio. *Tlacolol* is practiced on communally owned land and necessitates a great deal of time and labor but very little capital. Plow culture is practiced on privately owned land[3] and requires relatively little time and labor but considerable capital. In the former, there is a dependence almost exclusively upon family labor; in the latter, there is a greater dependence upon hired labor. In *tlacolol,* the yields are much greater per *cuartillo* of seed planted than in plow culture, but the amount of corn planted by each family is relatively little and never reaches the amount planted by a few of the larger operators in plow culture. In *tlacolol,* rotation

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[2] Tepoztecans use the word *cerros* to refer both to the spectacular, butte-like rock outcropping which surrounds the village and to the steep slopes covered with scrub forest. *Texcal* refers to land covered with the relatively recent volcanic flow which supports a thorny scrub forest with a predominating flora of copal gum, mimosa-like legumes, a true "sweet potato," and silk cotton trees. *Texcal* covers a strip of land approximately two kilometers wide on the western limits of the municipio, and constitutes about ten per cent of the total land area of the municipio.

[3] Lands recovered from the Hacienda of Oacalco by the municipio in 1930 represent an exception to the rule. Here we find communally owned lands divided into *ejido* plots and worked with plow and oxen.

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482
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Fig. 23. Tepoztecans, returning home from work.

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is practiced by necessity, for the fields cease to produce after the first few years; in plow culture, the same fields may be planted year after year until the soil is completely exhausted. [242]

Tlacolol is essentially geared to production for subsistence, while plow culture is better geared to production for the market. It is significant that most families who work *tlacolol* are landless and that *tlacolol* has traditionally been viewed as the last resort of the poor. However, farmers who own small plots of land may also work some *tlacolol* to supplement their meager income. Indeed, in the past few years a new trend is occurring in the village because of inflation. Tepoztecans who own considerable private land now rent it out or let it rest, and themselves work in *tlacolol*. This is resented by most *tlacololeros*, who believe that the communal lands should serve the landless. The attitude of the *tlacololeros* is better understood in the light of the fact that the communal lands are becoming exhausted and can no longer support the present-day population.

[433] [735] [178] [427] [678]

Other differences between *tlacolol* and plow culture include the cycles of work, the tools, the type of corn, the work techniques, and even the terminology. Gen-

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weeded field of one hectare. Whenever possible the weeds are plowed under to improve the fertility of the soil. The steel plow is used in the *barbecho*, and the land is plowed in one continuous furrow to make a concentric rectangular form.

If the field is large, it may be divided into two or three parts, each of which is plowed in the same fashion. The land is always plowed at right angles to the direction in which the rows of corn are to be planted, so that the rows can be kept straight. Tepoztecans pride themselves on having straight rows of corn, and farmers will compete with one another to see who can plow the straightest. One man with a single team of oxen can plow on an average of about two *cuartillos* a day. If time permits, two *barbechos* will be given; the second is always done soon after the first rains, toward the end of May or early in June.

In the case of *los tres arados* which is used in preparing a field that has been in cultivation the previous year,[7] the steel plow is also used, and the plowing follows the old corn beds and furrows. The plow is placed just to the right of the old cornstalks, and the earth is turned to the right. This is called the *primer arado* (first plowing). When the oxen reach the end of the furrow they are turned, and the same process is followed on the adjoining corn bed, so that a new mound of earth is formed where the furrow was before. This is called the *segundo arado* (second plowing). In both the first and second plowing a short yoke is used, and the oxen walk in the furrows on either side of the corn bed. The plow driver walks to the left of the bed, holds the plow with his right hand, and directs the oxen with his left. The *tercer arado* (third plowing) goes through the center of the corn bed. The third plowing forms part of the process of planting.

Planting: This generally begins a few days after the ground has been plowed, preferably when the earth is humid. But it is important to note that in Tepoztlán there is a great deal of leeway in the time of planting. A few days or even a few weeks make very little difference in the net results. Corn can be planted any time between June 1 and July 25 with a fairly good chance of getting a crop. Tepoztecans, therefore, follow no rigid work cycle. Of approximately four hundred farmers who may plant corn with plow and oxen in any one year, no more than a third begin their work immediately after the first rains. The reasons for this are varied. Many own neither land nor oxen and may be delayed in making arrangements for renting, in preparing their tools, plows, and yokes; others may still be busy selling wood and charcoal; still others may be delayed by illness or death in the family. It is a common sight in Tepoztlán to see corn at various stages of growth during the rainy season.

The selection of seed for planting is generally done soon after the harvest in January, when the finest ears of corn are set aside to be shelled later in May or June, just before planting. Three types of corn are used in plow culture, *ancho*

[7] Some use the *barbecho* on land that has been cultivated the year before, and then follow with *los tres arados*. This gives a better yield but involves at least three additional days of work for a plot of twenty *cuartillos* or approximately two hectares. Only the best farmers, about ten per cent, do this.

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blanco, *pepitillo blanco*, and *semilla azul*.[8] *Ancho blanco* is the most widely used corn; *pepitillo* is used only in the heavier clay soils. *Semilla azul* is used for replanting cornfields which have not germinated, because it ripens faster and catches up with the earlier plantings.

A large number of Tepoztecans still follow the custom of having the seed blessed by the priest on the day of San Isidro, May fifteenth. Generally the women take the corn to the church. Each woman selects about ten of the finest ears of corn, as well as some of her best beans and squash. She may also take along some copal and a censer. As many as two hundred women may attend this blessing. As they burn the incense in the church, the priest comes out and blesses the seed with holy water. The ears of corn which have been blessed are to be placed in the milpas to rot and must not be burned, or the seed will not grow.

The ancient custom of addressing the seed in Náhuatl, before planting, is still remembered by most men over age fifty. Many informants recall that their grandfathers spoke to the corn in a short formal ritual, before planting. The ceremony in the fields was often accompanied by great emotion and even weeping. One of these speeches translated from the Náhuatl follows:

"My beloved body and strength, go and bear the cold and the storm of the seasons; all is for us."[9]

Today a similar ritual is still followed by a relatively small number of Tepoztecans, except that the recitations include references to God and are said in Spanish. The following are examples of present-day blessings:

> God bless you. I bury you and if you return while I still live the satisfaction will be mine; if not then my descendants.
>
> In the name of God I am going to plant this seed. I implore Thee to bless my work.
>
> Bless your sainted name God Our Father who is the first one to care for us. From here you go out and from where you go out God wishes you to return. For I am going to throw you into the field and you will remain only with the blessing of God. And may God free you so that we all will have something.

In planting corn, two men and one team of oxen are the minimum requirement. More than one team is rarely employed on a single field. However, two or three men may be used if the owner has a large family or can afford to hire *peones*. In planting on land that has been newly broken, the plow is always pulled at right angles to the existing furrows. One man, the oxen driver, leads the oxen while another man follows and drops four seeds in the furrow for each plant at a space of about a pace apart. The seed is dropped in front of the left toe, and the dirt is pushed over the seeds with the right foot. In planting the first few seeds, some Tepoztecans still follow the old custom of making the sign of the cross with their hand as they drop the seeds. Older men believe that planting one day after the

[8] See Appendix A, p. 449.

[9] "Notlashocuyo yocatzin xomohuiaztzu quizquish cequintli tonalli huan yecatl timochical huitiui topampa."

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The harvesting of corn, like all other operations in agriculture, is done on an individual family basis, with hired help if necessary. There is a minimum of labor exchange and cooperation. Our findings differ from those of Redfield. Redfield writes:

> The men always work in groups; the owner of the field has asked them to help him—it it is *cuatequitl*—and then when their fields are ripe he will help them harvest. These are social occasions. Each group has *la mulita*, "the little mule"—a bottle of alcohol hidden under a pile of corn. The preparation of their dinner is also done cooperatively at the house of the owner of the field, and this is a social occasion for the women. They carry the dinner to the fields for the men. The owner of the fields supplies the food and drink. But there the cooperative harvesting ends, for the removal of the grain is done separately in each individual house, each member of the family taking a hand."[40]

This account refers to a type of cooperation which does not now exist in Tepoztlán, and our informants did not remember its having existed in 1926 or even before the Revolution of 1910. Corn is shelled by both men and women. Women generally shell corn by hand in small quantities for daily use in the house and for small-scale trade. Large-scale shelling by the *carga* is generally done by the men who use an *elotero*, which is made of dry corncobs bound together in the form of a flat disc, over which the corn to be shelled is rubbed. Some use the black volcanic rock from the *texcal* for shelling. However, the corn selected for seed is shelled by hand by the men. Women of the two upper barrios of San Pedro and Los Reyes frequently shell corn on a large scale, whereas in the larger, center barrios, large-scale shelling is considered a man's work. In many cases *peones* are hired for this job. The shelled corn is stored in sacks, for the most part, although there are still a few of the old *cuescomatl*. (See Fig. 28.) Many families put the skeleton of a dog's head or a piece of *ocote* wood and lime in the sacks or the *cuescomatl* to protect the corn against spoilage. Formerly when *cuescomatls* were made, the priest would be called to bless them. There is a belief that when a death occurs, the corn in the house or on the house site will be more subject to the ravages of insects.

The loss of stored corn from insects is one of the serious problems faced by Tepoztecans. Many farmers complain that they lose a few *cargas* a year in this fashion. It is rare to find corn that lasts through to August without being seriously damaged by corn worms. Tepoztecans have still received little help with this problem from Mexican agronomists.

An old tradition persists in the village to the effect that the boa constrictor was formerly used to prevent stealing of corn from the cornfields and the granary. It is said that the snake was fed salt and *tequesquite* by the owner of the field, and that thereafter the snake would frighten all strangers by climbing up the cornstalk and making a whistling noise. These snakes were apparently tame and did not harm the owner, but would attack strangers. There seems to have been some

[40] Redfield, *Tepoztlán*, pp. 126-27.

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estimate if we follow Tepoztecan classifications: First-class land will produce on an average of two *cargas* of ears of corn for every *cuartillo* of seed planted; second-class land will produce on an average of one *carga* for each *cuartillo* of seed; and third-class land will produce about one-half a *carga*. Thus productivity of the best land is about four times that of the poorest land.

Most Tepoztecans do not use fertilizer in their fields. They are apparently aware of its benefits but, because of the shortage of manure and the expense of commercial fertilizer, are unable to use it.

A few Tepoztecan farmers have attempted to divert seasonal streams, which come down from the mountain forests to their fields, to capture some of the rich humus of the forest, and the results have been spectacular. Portions of fields which received this humus more than tripled their production. There are unfortunately few such streams, and even if all were diverted in this fashion, they would help only a few farmers.

PRODUCTION TIME AND COST

An analysis of production time in plow culture is extremely difficult, because Tepoztecan peasants keep no records and because of the large number of variables to be considered. The following account, based upon careful observation of a few cases and extended interviews with many farmers, is presented with an awareness of some shortcomings on our part.

There is considerable range in the amount of man-days of work that goes into the clearing, planting, cultivation, and harvest of a cornfield. The most important variables are the nature of the terrain, the quality of the soil, the speed of the oxen and the workers, the type of seed used, etc. Judging from our data, the total number of man-days of work needed for the production of one hectare of corn ranges from about 35 to 65 days, depending upon the variables previously mentioned.

If we were to consider 50 man-days of work as an average we would not be far wrong. Actually, however, there are only about 35 days spent working a field of one hectare by any one man. Most men work as day laborers in the fields of others, so that on the average a man puts in about 50 work days in plow culture from the beginning of June to the end of December. However, this estimate does not include many days spent by the farmer in guarding his field against cattle and trespassers.

In Table 31 we present a study of the time spent in the production of corn in a milpa of ten *cuartillos*. In this case we have participated in and carefully observed each of the operations listed. In addition we have obtained estimates of production time from many informants, and some of these are given in Table 32.

It will be seen from these tables that the greatest amount of time is spent in cultivating and harvesting the corn. The preparation of the fields and the planting take relatively little time. The fact that farmers spend a relatively small part of the year at their major occupation gives them a great deal of time for other economic activities, as well as enforced leisure.

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him revert to human form. *Naguales* have the power to enter houses, even when doors are closed, can steal anything, and can quietly carry off girls by putting them into a deep sleep. To prevent thefts by *Naguales* a cross is marked on the bottom of *metates* which then become too heavy for the *Nagual* to lift. Some *Naguales* will steal girls for a sum of money. *Naguales* cannot be wounded by a knife or a gun, and it is impossible to hit them or throw stones at them because of a secret power which defends them. Some people believe that El Tepozteco can turn himself into a *Nagual* and that he is their chief.

Los aires are mysterious forces, variously thought of as winds, spirits, or little people who may cause sores, pimples, paralysis, and other illnesses. They are found in stream beds, ravines, in stagnant pools, and atop the highest hills. Tepoztecans are careful to avoid *los aires* and not to offend them. Some old women still say certain Náhuatl phrases asking permission of *los aires* to take water from the stream. Those who must pass by stagnant water after bathing in a *temascal* must drop some of the leaves, with which they dried themselves, into the pool in order to avoid headaches, earaches, or watering of the eyes. To get rid of these afflictions one must be cleansed with salt and yarrow leaves which are afterward thrown into the middle of the street. Sometimes when a person eats beside a stream or near a ravine, he will be attacked by *los aires* and will have a headache and fever. The illness is treated by cleansing the person with herbs, which are then thrown into the stream or ravine. If the sick person continues to have fever and dreams of canes, water, or food, it means that *los aires* struck him very hard and must be fed. *Mole*, tamales, and fruit are prepared, and a special loaf of bread in the shape of a doll is ordered from the baker. The doll is decorated in red, and the meal, adorned with red crepe paper, is carried to the suspected stream and left there.[10]

Los aires are also believed to take refuge in anthills, and one who disturbs an anthill may suffer grave injury. For this reason no Tepoztecan dares open an anthill to remove the queen ant, despite the fact that the local variety of ants is very voracious and can destroy an entire cornfield. When a farmer discovers an anthill in his field he will place food, such as mango leaves, around the hole, so that the ants will not eat the corn. The farmers sometimes place poisonous leaves at an anthill, but the ants soon learn not to eat them. Some of the more advanced farmers use chemical products including D.D.T. to kill the ants but even the most educated will not open an anthill.

Informants relate that not long ago a man, not of Tepoztlán, used to sell ant dung as fertilizer. He collected the material from anthills, but after six months of this work he fell ill, became badly crippled, and died. The same thing happened to the uncle of one of our informants; after opening an anthill he spent eight years in bed, crippled and inflamed from the effects of *los aires*.

Belief in good and bad omens continues in Tepoztlán. These beliefs are innu-

[10] In Redfield's account a real doll, with red cheeks and decorated with colored yarn, is used. The bread doll is more closely reminiscent of the dough images offered in propitiation in pre-Hispanic times.

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But Tepoztecans have their own problems. Their agricultural resources are limited and of poor quality, their technology is backward, and their productivity low. Less than forty per cent are landowners, and holdings are much too small to support a higher standard of living. Moreover, there is no new land available, since the village is surrounded by other municipios with similar problems. It should be emphasized that, on the whole, Tepoztecans have a profound knowledge of their physical environment and have made as good an adjustment to it as might be expected. They are familiar with the advantages of crop rotation and practice it to the extent to which the size of their landholdings permit. They also know the benefits of letting land lie fallow, but again the majority of families do not have sufficient land to practice it. An ancient form of terracing is used to prevent soil erosion, but this is only partially effective, and erosion continues. Perhaps the most important improvement in agriculture would be the use of commercial fertilizer. Corn production could be doubled in many instances, but the high price of fertilizer makes this a difficult innovation. Irrigation and insect control would also be of great benefit to Tepoztlán.

The prospects of solving the agricultural problems through mechanization are slight. The rough and hilly terrain rules out the use of tractors and the very small size of holdings would make it uneconomical. In fact, even plow culture is becoming a burden because of the increased need of capital. As we have seen, some Tepoztecans are turning to the more primitive system of hillside hoe culture in order to avoid the rising costs of the recent inflationary period. But this system is an anachronism in the modern scene. It is further depleting the communal resources and cannot support an expanding population with a higher standard of living. Although the *ejido* program has helped to relieve the agrarian problem it has by no means solved it in Tepoztlán. It is difficult to see how the standard of living can be appreciably raised in such an environment. As the means of communication improve and the aspirations of the people rise, the move to the city will in all probability increase. That this has not occurred on a larger scale before this is an interesting commentary on the Tepoztecan character. Most of the young people are still quite provincial and fear the dangers of the outside world.

Given the objective limitation of Tepoztecan economy and environment, their history of colonial status over a three-hundred-year period, the instability and chicanery of Mexican politics, and the unplanned and haphazard nature of social change due to urban influence, we can better understand the psychology and world view of the Tepoztecans. It is a psychology of living with problems rather than solving them, of constantly adjusting to difficulties rather than eliminating them.[28]

We have seen that in the increased contact with the outside world in recent years, Tepoztecans have taken many new traits of modern life. They now have Coca-Cola, aspirin, radios, sewing machines, phonographs, poolrooms, flashlights, clocks,

[28] In a recent paper, discussing Indian and Ladino values, John Gillin has suggested that the drive to manipulate and control the environment was more characteristic of the Ladinos than of the Indians. Following this, Tepoztlán would appear to be more Indian.